

WATER CLOSET CONNECTOR SEAL

BACKGROUND OF THE INVENTION

[0001] The field of the invention is connections between plumbing fixtures and drainage piping and in particular the invention relates to sealing water closets to an associated drain pipe.

[0002] Water closets are commonly connected to a three inch or a four inch PVC plastic drain pipe using a standardized PVC plastic closet flange. The downwardly extending annulus or hub of the plastic closet flange is dimensioned to accept a three inch plastic drain pipe in its interior and a four inch plastic drain pipe on its exterior. In both instances the plastic drain pipe is secured to the closet flange hub by a commercially available solvent cement.

[0003] It has long been recognized that the connection between the water closet and the drain pipe is the most troublesome connection in the plumbing system. A leaking connection will allow sewer gas to enter the building and if stoppage occurs in the drain pipe, sewage may be discharged into the cavity beneath the water closet with attendant breeding of germs. It is customary to use putty or a wax ring to seal the water closet to the closet flange or the drain pipe; however, such sealing arrangements are often ineffective. There have been many attempts to improve the sealing between the water closet and the drain pipe as evidenced by a United States patent number 2,976,543 issued March 28, 1961 to H.J. Turner et al. for a Gasket Ferrule, a United States patent number 5,185,890 issued February 16, 1993 to G.W. Dismore et al. for a Toilet Bowl Sealing Assembly, a United States patent number 5,291,619 issued March 8, 1994 to C.R. Adorjan for a Water Closet Sealing Adapter, a United States patent number 5,937,450 issued August 17, 1999 to B. Jones for a Method and Device for Attaching Fittings to Receptacle and a United States patent number 6,070,910 issued June 6, 2000 to B.E. Hodges for a Push-In

Closet Flange. These and other proposed solutions to the water closet sealing problem have not been found satisfactory for a number of reasons. Some require too many parts, some are too costly and some do not accommodate both three and four inch sewer pipe.

SUMMARY OF THE INVENTION

[0004] An inexpensive one piece seal adapter is provided for sealing a water closet connected by a closet flange to either a three inch drain pipe or a four inch drain pipe. The seal adapter is made of an elastic plastic and includes a tubular portion with a pair of axially spaced annular flanges extending radially outward from the tubular portion a sufficient distance to make sealing contact with the interior of either a three inch sewer pipe or with the interior of the tubular part of the closet flange when a four inch sewer pipe is connected thereto. The seal adapter includes a radially outward extending annulus at the upper end of the tubular portion and preferably has a washer shaped seal adhesively secured at its underside to the upper surface of the annulus.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] The invention is illustrated in the accompanying drawings, in which:

Figure 1 is a section showing the seal adapter between a water closet and a three inch sewer pipe;

Figure 2 is a section showing the seal adapter between a water closet and four inch sewer pipe;

Figure 3 is a section of the seal adapter, and

Figure 4 is a section of the seal adapter installed between a water closet and a four inch sewer pipe including an additional sealing washer between the adapter and the top of the closet flange.

DETAILED DESCRIPTION OF THE INVENTION

[0006] As illustrated in Figure 1, a water closet 11 is secured to a floor 12 by a somewhat standard closet flange 13 having a collar 14 connected to the base 15 of the water closet 11 by bolts and nuts, such as the bolt 16 and the nut 17 shown in Figure 4. The collar 14 is secured to the floor 12 by screws 18. The closet flange 13 includes a tubular part 19 which extends downwardly through an opening 21 in the floor 12. The interior diameter of the tubular part 19 is approximately the same as the exterior diameter of a three inch sewer pipe 22 and, as shown in Figures 2 and 4, the exterior diameter of the tubular part 19 is substantially the same as the four inch interior diameter of a four inch sewer pipe 23. The closet flange 13 and the sewer pipes 22, 23 are typically made of PCV plastic and are interconnected, as shown in the drawings, by solvent cement. The water closet 11 has a discharge opening 26 in a downwardly extending annular protuberance 27 which is in general alignment with the floor opening 21 and with the tubular part 19 of the closet flange 13. A downwardly facing flat surface 28 surrounds the protuberance 27 in the cavity on the underside of the base 15 of the water closet 11.

[0007] A one piece elastic plastic seal adapter 31 forms a sealing connection against gas and sewage leakage between the underside surface 28 of the water closet 11 and the closet flange 13 when either one of the sewer pipes 22 or 23 is attached to the closet flange 13. The seal adapter 31 includes a flat horizontal annulus 32 which, as shown in Figure 3, has parallel upper and lower surfaces 33, 34 in confronting or sealing relation to the underside surface 28 of the water closet 11 and the upward facing surface 36 of the collar 14, respectively. As illustrated in Figures 1 and 2 the annulus 32 of the seal adapter 31 includes a foam plastic washer shaped seal 37 whose underside is adhesively secured to the annulus 32 of the adapter 31 and whose top side is adhesively secured to the downward facing surface 28 of the water closet 11. Figure 4 shows

a second embodiment of the invention in which a second foam plastic washer 41 is adhesively bonded to the underside of the annulus 32 of the seal adapter 31. The second foam plastic washer 41 is used for non-standard water closets.

[0008] The one piece adapter seal 31 includes a tubular portion 46 which extends downwardly from the interior diameter of the annulus 32 and has an outside diameter substantially smaller than the inside diameter of the tubular part 19 of the closet flange 13. A pair of axially spaced elastic plastic annular flange seals 47, 48 are integrally formed with and extend radically outward from the tubular portion 46 a sufficient distance to form an effective seal with the inside diameter of the 3 inch sewer pipe 22, as shown in Figure 1, or with the inside diameter of the tubular part 19 of the closet flange 13, as shown in Figure 2, wherein a 4 inch sewer pipe 23 is connected to the tubular part 19. As shown in Figure 3, in which an uninstalled seal adapter 31 is illustrated, the thickness of the flange seals 47, 48 tapers radially from the tubular portion 46. A thin removable plastic sheet 51 placed in protective cover on the top of the seal 37 is removed prior to installation of the seal adapter 31.

[0009] The seal adapter 31 shown in Figure 3 is an effective one-piece seal for a water closet connection to either a 3 inch or 4 inch sewer pipe. The plumber need only be concerned about being supplied with a single component for sealing water closets to 3 or 4 inch sewer pipes, which covers most residential buildings and a large portion of commercial buildings.